

*What Is Claimed Is:*

1. A mutein of human basic fibroblast growth factor, or a biologically active peptide thereof, comprising the substitution of a neutral and/or hydrophobic amino acid for one or more of the following:

- 5 (a) Glutamate 89; or  
(b) Aspartate 101; or  
(c) Leucine 137.

2. The mutein of claim 1 which comprises the substitution of a hydrophobic amino acid for Glu<sup>89</sup>.

10 3. The mutein of claim 1 which comprises the substitution of a hydrophobic amino acid for Asp<sup>101</sup>.

4. The mutein of claim 1 which comprises the substitution of a hydrophobic amino acid for Leu<sup>137</sup>.

15 5. The mutein of claim 1 which comprises the substitution of a neutral amino acid for Glu<sup>89</sup>.

6. The mutein of claim 1 which comprises the substitution of a neutral amino acid for Asp<sup>101</sup>.

7. The mutein of claim 1 which comprises the substitution of a neutral amino acid for Leu<sup>137</sup>.

20 8. The mutein of claim 1 wherein a neutral amino acid is defined as alanine and a hydrophobic amino acid is defined as tyrosine.

9. The mutein of claim 1 which is human basic fibroblast growth factor [Ala<sup>89</sup>].

10. The mutein of claim 1 which is human basic fibroblast growth factor [Ala<sup>101</sup>].

11. The mutein of claim 1 which is human basic fibroblast growth factor [Ala<sup>137</sup>].

5 12. The mutein of claim 1 which is human basic fibroblast growth factor [Ala<sup>89, 101</sup>].

13. The mutein of claim 1 which is human basic fibroblast growth factor [Ala<sup>89, 137</sup>].

10 14. The mutein of claim 1 which is human basic fibroblast growth factor [Ala<sup>101, 137</sup>].

15. The mutein of claim 1 which is human basic fibroblast growth factor [Ala<sup>89, 101, 137</sup>].

16. The mutein of claim 1 which is human basic fibroblast growth factor [Tyr<sup>89</sup>].

15 17. The mutein of claim 1 which is human basic fibroblast growth factor [Tyr<sup>101</sup>].

18. The mutein of claim 1 which is human basic fibroblast growth factor [Tyr<sup>137</sup>].

20 19. The mutein of claim 1 which is human basic fibroblast growth factor [Tyr<sup>89, 101</sup>].

20. The mutein of claim 1 which is human basic fibroblast growth factor [Tyr<sup>89, 137</sup>].

21. The mutein of claim 1 which is human basic fibroblast growth factor [Tyr<sup>101, 137</sup>].

5 22. The mutein of claim 1 which is human basic fibroblast growth factor [Tyr<sup>89, 101, 137</sup>].

23. A polynucleotide encoding the mutein of claim 1.

24. The polynucleotide of claim 23 which is DNA.

25. The polynucleotide of claim 23 which is genomic DNA.

10 26. The polynucleotide of claim 23 which is a cDNA.

27. The polynucleotide of claim 23 which is RNA.

28. A vector containing the DNA of claim 25.

29. A vector containing the DNA of claim 26.

30. A vector containing the RNA of claim 27.

15 31. A host cell comprising the vector of claim 28.

32. A host cell comprising the vector of claim 29.

33. A host cell comprising the vector of claim 30.

34. A process for producing a polypeptide comprising expressing from the host cell of claim 32 the polypeptide encoded by said DNA.

35. A process for producing a polypeptide comprising expressing from the host cell of claim 33 the polypeptide encoded by said DNA.

36. A process for producing the vector of claim 28 which comprises:

- (a) inserting the polynucleotide of claim 25 into the vector; and
- (b) selecting and propagating said vector in a host cell.

37. A process for producing the vector of claim 29 which comprises:

- (a) inserting the polynucleotide of claim 26 into the vector; and
- (b) selecting and propagating said vector in a host cell.

38. A process for producing the vector of claim 30 which comprises:

- (a) creating a recombinant RNA molecule containing the RNA sequence of claim 27; and
- (b) selecting and propagating said vector in a host cell.

39. A method of stimulating cell division which comprises:

- (a) contacting cells with an effective amount of the mutein of claim 1 *in vitro*; or
- (b) contacting cells with an effective amount of the mutein of claim 1 *in vivo*.

40. A pharmacologic composition useful for stimulating cell division comprising the following:

- (a) An effective amount of the human basic fibroblast growth factor mutein of claim 1; and
- (b) An acceptable pharmaceutical carrier.

41. A method of healing a wound comprising contacting said wound with an effective amount of the mutein of claim 1.

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42. A method of treating ischemia comprising contacting cells with an effective amount of the mutein of claim 1.

43. A method of treating peripheral vascular disease comprising contacting cells with an effective amount of the mutein of claim 1.

5 44. A method of treating a neural injury comprising contacting cells with an effective amount of the mutein of claim 1.

45. A method of treating a gastric ulcer comprising contacting cells with an effective amount of the mutein of claim 1.

10 46. A method of treating a duodenal ulcer comprising contacting cells with an effective amount of the mutein of claim 1.

47. A method of treating heart disease comprising contacting cells with an effective amount of the mutein of claim 1.

Add 88

Add B1

Add C3

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